COMMON CORE GEOMETRY BY eMATH INSTRUCTION
COMMON CORE PARCC EOY STANDARDS ALIGNMENT

GEOMETRY DOMAIN KEYS

CO = CONGRUENCE

C = CIRCLES

GPE = EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS

MG = MODELING WITH GEOMETRY

SRT = SIMILARITY, RIGHT TRIANGLES, AND TRIGONOMETRY

GMD = GEOMETRIC MEASUREMENT AND DIMENSION

G-CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

Unit #1 - Lesson #1, Lesson #2, and Lesson #5

G-CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

Unit #2 - Lesson #1 and included in most other Unit #2 lessons

G-CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

Unit #2 - Lesson #9

G-CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

Unit #2 - Lesson #2, Lesson #3, and Lesson #5

G-CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Unit #2 - Lesson #3, Lesson #4, Lesson #5, and Lesson #6

G-CO.6 Use geometric descriptions of **rigid motions** to transform figures and to predict the effect of a given **rigid motion** on a given figure; given two figures, use the definition of congruence in terms of **rigid motions** to decide if they are congruent.

Unit #2 - Lesson #6, Lesson #7, and Lesson #8

G-CO.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

Unit #2 - Lesson #6, Lesson #7, and Lesson #8

G-CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Unit #2 - Lesson #8

G-CO.9 Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

Unit #2 - Lesson #2, Lesson #4, Lesson #5, Lesson #7, and Unit #3 - Lesson #2

G-CO.10 Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

Unit #2 - Lesson #4, Unit #3 - Lesson #6 and Lesson #8, Unit #3 - Lesson #8, Unit #6 - Lesson #4, and Unit #7 - Lesson #10

G-CO.11 Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

Unit #6 - Lesson #1, Lesson #2, Lesson #3, Lesson #5, Lesson #6, and Lesson #7

G-CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*

Unit #1 - Lesson #5 and Lesson #6, Unit #4 - Lesson #1 through Lesson #6, Unit #9 - Lesson #11

G-CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Unit #4 - Lesson #7

G-SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor:

a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

Unit # 7 - Lesson #1 through Lesson #3

b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

Unit # 7 - Lesson #1 and Lesson #2

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G-SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

Unit #7 - Lesson #4

G-SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Unit #7 - Lesson #5

G-SRT.4 Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

Unit #7 - Lesson #8 and Lesson #12

G-SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Unit #3 - Lesson #4 through #9 and Unit #7 - Lesson #6 through Lesson #12

G-SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

Unit #8 - Lesson #1 and Lesson #2

G-SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.

Unit #8 - Lesson #2 and Lesson #3

G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Unit #5 - Lesson #6, Unit #8 - Lesson #4 through Lesson #6

G-C.1 Prove that all circles are similar.

Unit #10 - Lesson #6

G-C.2 Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*

Unit #9 - Lesson #1 through Lesson #8

G-C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle, i.e. *opposite angles are supplementary*.

Unit #4 - Lesson #4 and Lesson #6

G-C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Unit #10 - Lesson #4 and Lesson #6

G-GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

Unit #9 - Lesson #9 and Lesson #10

G-GPE.4 Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, $\sqrt{3}$) lies on the circle centered at the origin and containing the point (0, 2).*

Unit #5 - Lesson #1 through Lesson #8 and various other lessons throughout the text past Unit #5

G-GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Unit #5 - Lesson #1 and Lesson #2 and Unit #9 - Lesson #12
G-GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

Unit #7 - Lesson #9

G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Unit #10 - Lesson #1 and Lesson #3

G-GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*

Unit #10 - Lesson #2, Lesson #4, and Lesson #9

G-GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

Unit #10 - Lesson #8 through Lesson #11

G-GMD.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Unit #10 - Lesson #7

G-MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

Unit #10 - Lesson #8 through Lesson #11

G-MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

Unit #10 - Lesson #3, Lesson #4, and Lesson #8 through Lesson #10 (Density included in a variety of problems)

G-MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Unit #10 - Lesson #8 through Lesson #11